Sub-Council Area Projections Data

Utility for

POPGROUP v.4.1

User Guide

9 June 2020 version 1 (beta)

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1 Introduction

This document describes a utility for storing past population, births and deaths in user-defined areas within a local authority district. It creates a POPGROUP model and fills input files with official data. It also creates initial migration files, ready to be used in population projections.

The Utility is to be used with the *Sub-Council Area Population Projections User Guide* published in December 2019. The Utility performs the tasks outlined in that Guide's Section 3 and 4 (up to and including 4.6).

The Utility has been developed for use in Scotland, and contains within it data for all Scotland's Datazones (DZs). It is designed to also be used with data for Lower Super Output Areas (LSOAs) in England and Wales – see Appendix C of this document.

The user must provide an Excel lookup file with the allocation of standard areas (DZs or LSOAs) to each of the areas the user wishes to use in a population projection – see Section 3 of this document.

The Utility produces the following as output:

- POPGROUP model of skeleton, input and output folders, labelled according to the user's areas.
- Input files cons-YY.xls, fert1.xls, mig_IN1.xls, mig_OUT1.xls, mort1.xls, popbaseXX.xls, where XX and YY refer to the first and last years of official population estimates.

To produce full population projections, the user will follow the *Sub-Council Area Population Projections User Guide* – see Section 5 of this document. The model specifies migration with a single external area, combining all national and international migration, and allowance for up to three special populations (Armed Forces, Students, Prisoners), as advised in the *Sub-Council Area Population Projections User Guide*[1]. Migration is simply a set of national rates to set an initial

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[1] The migration flows and special populations are named on a hidden sheet 'SpecPop and Migration' within the Utility. If a user ever wished to fill sub-Council area data into a model based on adding a second external

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plausible age-pattern of migrants. Subsequently the software will estimate local migration from the past annual population change. The Data Utility implements the enhancement to initial migration suggested in Q&A 8, solution 2, p73

Sub-Council Area Population Projections User Guide is available from https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-and-household-sub-council-area-projections/user-guidance, and also from the 'Reference Manuals and User Guides' section of https://edgeanalytics.co.uk/popgroup.php/.

The Data Utility can be used by a novice. However it is strongly recommended that the user is or becomes familiar with POPGROUP through past experience with Council area data, or through the video and associated support for developing local demographic models with POPGROUP, provided by NRS and available at https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-and-household-sub-council-area-projections/user-guidance.

This user guide is structured as follows:

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migration area or different special populations, this hidden sheet may be amended and the Utility will function with these changed details. However, the short labels for the existing migration flows in the Utility must not be changed.

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Appendix B: Use in England and Wales

Notes on how to use the Utility with data for LSOAs in England and Wales.

Appendix C: Source Data files

Notes on the content of the source data, and its updating.

!	The Data Module described in this document has been developed for use with the POPGROUP software (version 4.0 or 4.1). Please ensure that you have installed POPGROUP v.4 before running the Data Module.
!	Before running the Data Module it is necessary to configure MS Excel settings so that the Data Module can run correctly. You may have made the necessary changes to these settings as part of previous installations but for confirmation and further instructions, please refer to the Appendix A of this document.

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2 Installing the Utility

It is recommended that POPGROUP, the Derived Forecast model and the Data Modules (including this utility) are organised on your PC using the following folder structure (for new users, the installation will ensure that this structure is created):
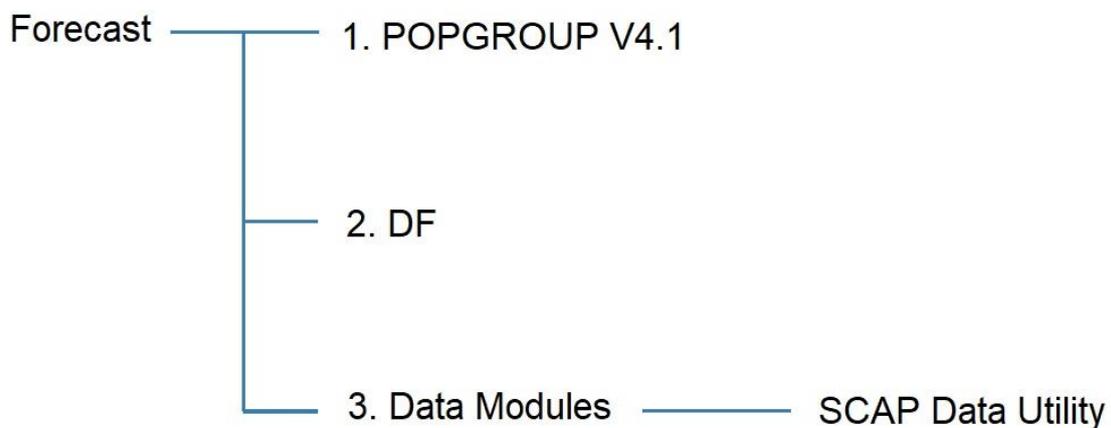
The installation of the SCAP Data Utility consists of one zipped file (`SCAPDataUtility.zip`).

To install the Data Utility:

1. Insert the CD (if you have one) into your disk drive, or download the zipped file for the Scotland Utility from the NRS website here.

2. Using Windows Explorer, navigate to the zip file and double click on it. Click on *Extract All* (Windows 10, same or equivalent in other versions). A dialog box will ask you to confirm the folder in which the program will reside (type or navigate to *'C:\Forecast\3. Data Modules'*, or the location of your own Data Modules folder). Click *'Extract'*.

3. The installation will create a new folder called 'SCAPDataUtility' in your Data Modules folder. Within that folder it will place the `SCAPDataUtility.xlsm` workbook and two subfolders, Files and Source Data.

On the CD or NRS website you will also find a copy of this user guide.

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3 Preparing the lookup table to define your sub-Council areas

Before using the utility, you must prepare a lookup table of all the standard small areas in your local authority (DZs in Scotland, LSOAs in England and Wales), and allocate each to one of the areas in your desired demographic model. Section 1.4 of the *Sub-Council Area Population Projections User Guide* describes how you may choose your areas, which could be electoral wards, housing or planning areas, social care areas, community areas and so on. The rule of thumb is that they should be useful to policy and not so small to suffer from a lot of unpredictable change from year to year.

3.1. Rules for the lookup table to define sub-Council areas

The lookup table must be in the worksheet of an excel file, in the first four columns. Two examples of the layout are given on the next page. The maximum number of sub-Council areas that POPGROUP can handle is 40.

The lookup table must be in the first columns of an Excel worksheet. The column headings in row 1 are not important and are not checked. The data starting in row 2 must be as follows:

Column 1: The standard area (DZ or LSOA code as used by NRS and ONS).

Column 2: The short name of the sub-Council area (SCAP) that contains this standard area. Up to 8 characters, not all numeric, with only characters allowed in an Excel sheet name, ie excluding special characters / \ * ? [ ] :. The short names are used to name Excel sheets holding data for that sub-Council area.

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Example lookup files

	A	B	C	D
1	DZ or LSOA code	SCAP area short name	SCAP area long name	Proportion
2	S01007284	MICT	Mull, Iona, Coll and Tiree	1
3	S01007285	MICT	Mull, Iona, Coll and Tiree	1
4	S01007286	MICT	Mull, Iona, Coll and Tiree	1
5	S01007287	MICT	Mull, Iona, Coll and Tiree	1
6	S01007288	MICT	Mull, Iona, Coll and Tiree	1
7	S01007306	Lorn	Lorn and the Inner Isles	1
8	S01007307	Lorn	Lorn and the Inner Isles	1
9	S01007308	Lorn	Lorn and the Inner Isles	1
10	S01007309	Lorn	Lorn and the Inner Isles	1
11	S01007310	Lorn	Lorn and the Inner Isles	0.832
12	S01007310	Lorn	Mid Argyll	0.168
13	S01007311	Margyll	Mid Argyll	1
14	S01007312	Margyll	Mid Argyll	1

Housing areas ⊕

Example lookup file using the optional column of proportional allocation of DZs to user areas

	A	B	C
1	S01	SCAPArea2019ShortName	Electoral Wards
2	S01006538	Airyhal	Airyhall-Broomhill-Garthdee
3	S01006539	Airyhal	Airyhall-Broomhill-Garthdee
4	S01006540	Airyhal	Airyhall-Broomhill-Garthdee
5	S01006541	Airyhal	Airyhall-Broomhill-Garthdee
6	S01006543	Airyhal	Airyhall-Broomhill-Garthdee
7	S01006545	Airyhal	Airyhall-Broomhill-Garthdee
8	S01006599	Airyhal	Airyhall-Broomhill-Garthdee
9	S01006762	BrdgeDon	Bridge of Don
10	S01006763	BrdgeDon	Bridge of Don
11	S01006764	BrdgeDon	Bridge of Don
12	S01006765	BrdgeDon	Bridge of Don
13	S01006766	BrdgeDon	Bridge of Don
14	S01006767	BrdgeDon	Bridge of Don

Aberdeen City | Aberdeenshire | Angus | Argyll and Bute | City of Edinburgh | Clackmannanshire | Dunfries and Gall

Extract from the NRS lookup from DZs to multi-member wards, `mmw-lookup.xlsx`.

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Column 3: The SCAP long name. This is used within an Excel sheet. The utility will use the long name associated with the first occurrence of each short name.

Column 4 (optional): A proportion between 0 and 1 to show the share of the standard area's data within the user's sub-Council area. If any or all rows of this column are blank, a 1 is assumed, ie the standard area is counted wholly within the named user's area, which is usually the case.

When running the utility, the following errors are identified, and the message displayed. The utility stops to allow the user to correct the error.

Error found in lookup file	Error message when running utility
Lookup file contains a short label >8 characters	The short label <Short Label> + <Row and Column> is over 8 characters long. Please shorten this value.
Lookup file contains a short label with a bad character.	Bad Character <Name of Bad Character> found in the lookup file. <Row and Column>
Lookup file contains a row with an area code but is missing short or long label.	<Row and Column> is blank. Please ensure there is a corresponding long and short label for all area codes
Over 40 sub-areas found in lookup file	The lookup information that you have provided contains too many sub-areas. The maximum amount is 40 and the utility found <Count of Sub Areas>. Please review your lookup file.

The lookup file may have more than one sheet, in which case the utility will provide a drop-down list of the sheets for the user to choose the sheet with the desired lookup table.

3.1.1. Things that the utility does *not* check, which are the responsibility of the user

- The utility does not check that all the standard areas in a local authority have been included in the lookup file. Occasionally there may be a good reason for using a subset of standard areas, or the standard areas in more than one local authority (for health areas that span two or more local authorities, for example).
- The column headings in row 1 are not checked. Their content is at the user's discretion.
- The short and long names are not checked for consistency. Each different short name is counted as a separate sub-Council area. The long-name in the row of it's a short name's first occurrence is used as the long name for that sub-Council area.

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- If proportional allocation is used in column 4, the utility does not check that each standard area has been wholly shared between user areas and not allocated more than once.

!	The following circumstances are not checked and will result in the message 'An unexpected error has occurred' during data aggregation, and the Utility will stop: • A standard area code in column 1 which does not correspond to any code in the source data: either DZs in Scotland or LSOAs in England or Wales. • Contents in the fourth optional column that are not blank or numeric.

4 Using the Data Utility

4.1. Data Utility Setup

To run the Data Utility, open the setup file **SCAPDataUtility.xlsm**. It can be found in the '…\SCAPDataUtility' folder after installation. If obtaining the file from the internet or via email, it may be necessary to click to 'Enable editing' on its first opening, and then save the file so that the message will not appear again.

Click the [Clear Form] button, to start the process with the following screen. The user activates the Utility in four steps, which are documented on-screen with notes at the left, a pop-up comment when hovering over any of the data entry boxes which are shaded yellow, and blue action buttons.

The following notes summarise the instructions that are on-screen.

Sub-Council area projections (SCAP) of population

Aggregation of data to sub-Council areas and transfer to a POPGROUP model, creating input files. Refer to the SCAP Data Utility Guide and the Sub-Council area population projections User Guide.

[Clear Form]

Area Number	Short Label	Long Label

Step 1 - Define Paths

Please provide paths to the relevant folders and files. Use the 'Set Defaults' button below to automatically fill some of these fields. The lookup file and standard rates file will need to be specified manually. To set a path manually, simply double click the relevant cell.

[Set Defaults]

Location of POPGROUP folder:
Folder of source data:
Lookup file to sub-Council areas:
Standard Rates:

Step 2 - Model Information

Please provide the relevant information about the model you wish to create. Please note that the value for Model ID must not be altered after completing the model setup process. Default Year values will be written in based on the source data files provided.

Base Year of Population: Last Year
File Header: All-Areas Short Label
Model ID: All-Areas Long Label

Step 3 - Model Setup

When steps 1 and 2 have been completed please press the 'Run Model Setup' Button. This will copy the information you have provided to the POPGROUP Model Setup file. Please check that the information is correct and then press the blue button at the top of the worksheet to create workbooks. Once the process has been completed please re-open this file and progress to step 4.

[Run Model Setup]

Step 4 - Data Aggregartion

After running the Model Setup process please press the 'Run Aggregation' button. This will use the lookup information that you have provided to aggregate the data within the source data files, fill the skeleton files you have just generated and then save them as PG input files within your Model folder. Upon completion this form will save a copy of itself within the same folder and close.

[Run Aggregation]

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4.2.   Step 1 – Define Paths

Click the **Set Defaults** button. The Utility fills in some of the data entry. To fill the remaining items, the user must double click on cells to navigate to the files or folders requested:

Location of POPGROUP folder: This usually ends in /POPGROUP V4.1.

Folder of Source Data: This is within the Utility folder and will be found automatically after clicking *Set Defaults*. The Utility checks that the data files are present (see Appendix C), that there are no gaps in the years of data, and that a metafile of data exists. It will create a metadata file if one does not exist, to help complete the data entry.

Lookup file to sub-Council areas: The user's Excel file as described in Section 3 above. Double-click and navigate to the file you have prepared. The Utility will validate your file, notify the first error it finds, or if there are no errors it will copy a list of areas on your file to the Utility. The Utility lists every unique area short name it finds, and the long name it finds next to the first occasion it encounters each short name. These will be used in the demographic model and its outputs. Check that the number and naming of areas is as you expected.

Standard Rates: On double clicking here, the Utility presents a drop-down list of the files it finds in the POPGROUP folder. Choose one, or navigate to the file you wish to use. Standard Rates files contain the projected national fertility, mortality and migration rates that will be the starting point for the model. You will usually use the file provided by Edge Analytics for the latest official national projection for the country containing your local authority, eg Standard_Scotland_2018.xls.

After completion, this section will appear as follows (example only):

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4.3. Step 2 – Model Information

The entries for this section must be typed in by the user.

Base year and last year of data: The first and last years of the source data will have been filled here when the *Set Defaults* button was used above. The default gives the longest available historical series of population change for each area. The values can be changed if the user wishes to use a shorter series, for example by starting the model in 2011. This will not change the population projections that will be made, but give a shorter time series of past years for context.

File Header: This text will be reproduced on each input and output file.

Model ID: This will be used to name the folders that the model is kept in. Use a label that will remind you of the areas and the base year, for example 'BradfordWards_2001' or 'AB_HMAs_2001'.

All-Areas Short Label: This will be used to name Excel sheets referring to the area that contains all your sub-Council areas. It cannot be purely numeric or contain symbols not allowed to name Excel sheets, and may have up to 8 characters.

All-Areas Long Label: This will be used on the Excel sheets to refer to the area that contains all your sub-Council areas. It may contain any symbol.

After completion, this section will appear as follows (example only):

Step 2 - Model Information		
Base Year of Population:	2001	Last Year 2018
Please provide the relevant information about the model you wish to create. Please note that the value for Model ID must not be altered after completing the model setup process. Default Year values will be written in based on the source data files provided.	File Header: Argyll & Bute HMAs	All-Areas Short Label ArgBute
	Model ID: AB_HMAs-2001	All-Areas Long Label Argyll & Bute

4.4.   Step 3 – Run Model Setup

When you are happy with the data entries in Steps 1 and 2, click the [Run Model Setup] button. The entries in Sections 1 and 2 are checked, with a message for the first missing or invalid entry if any are found.

The Utility will create a POPGROUP model setup file using the information you have provided. The settings will be as described in Section 3 of the *Sub-Council Area Population Projections User Guide*. It will become the active file and look like this, using your information. Do not change any of the entries.

Click on the blue button at the top
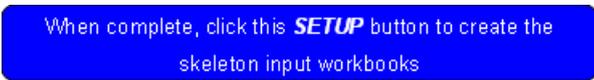
When you click this button, POPGROUP works to create files ready for data entry, structuring them to include the number and names of the sub-Council areas on your lookup file. During the creation of these files, the following normal message will appear. Click OK (only one migration type is used, as there is no evidence to distinguish internal and international migration to and from each sub-Council area).
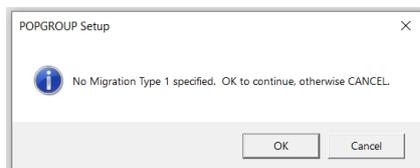
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After about a minute, a message will notify the creation of the model and its skeleton data files. The Model Setup file may be closed. It has been saved by the utility in the POPGROUP folder and identified with the Model ID: `MODEL_SETUP_<ModelID>.xls`.

A demographic model has been produced for you as three folders within your POPGROUP folder:

<Model ID>-inp   For input files of assumptions. It is empty at present.

<Model ID>-out   For output files from projections. It is empty at present

<Model ID>-skel   Skeleton input files ready for filling with data.

4.5.   Step 4 – Run Aggregation

This final step is only possible after the previous steps have been completed. It aggregates the official data of population, births and deaths to your sub-Council areas, enters them onto the skeleton data files of your model, and saves each file in the model's input folder as required for a population projection.

First, reopen the file `SCAPDataUtility.xlsm`. It will still have the details that you entered in earlier steps.

Click the   [Run Aggregation]   button.

The time taken depends on the computer speed and the number of areas. For a reasonably fast computer and 8 areas of a local authority in Scotland, the aggregation took 2 minutes. It will take longer for more areas, and for England or Wales. The Utility provides a progress box showing the files and sheets it is reading or writing:
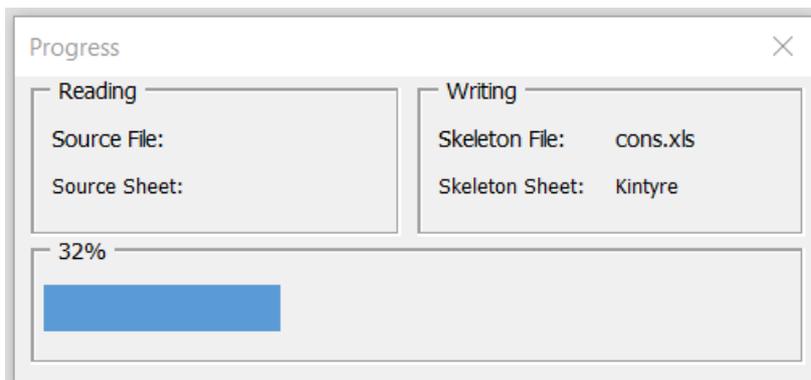
When finished, a message like this one is displayed.
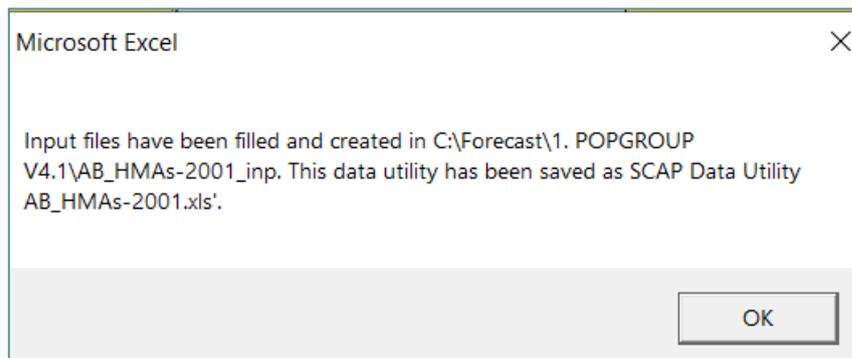
A copy of the Utility file is saved in the POPGROUP folder as `SCAP Data Utility <Model ID>.xls`.

4.6.   Files produced by the utility

Six files have been produced as follows. In this example the base year was 2001 and the final year of official data was 2018. The files are located in your input folder. This is the sub-folder within your POPGROUP area, and is named with the model ID you gave above, followed by '-inp'.

`cons2002-18.xls`   Mid-year population estimates, by sex and single year of age, each year after the base year.

`fert1.xls`   Births by sex, each annual period since the base year, and national projected fertility rates by age.

`Mig_IN1.xls`   Standard national distribution migration between sex and single years of age.

`MigOUT1.xls`   Standard national out-migration rates, by sex and single year of age.

`Mort1.xls`   Deaths by sex and age-group, each annual period since the base year, and national projected mortality rates by sex and age.

`Popbase2001.xls`   Mid-year population estimate, by sex and single year of age, for the base year.

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5 Completing a population projection

The Data Utility has achieved the most laborious parts of population projection: constructing a model and filling it with official data from past years. It has completed the steps in *Sub-Council Area Population Projections User Guide* up to and including Section 4.6 of that Guide. Your next steps are as described in the User Guide which you should follow, as summarised here:

Section 4.7: Supplement the official data provided by this Data Utility, with annual data for the age and sex composition for Armed Forces, Students or Prisoners, if you have decided to use them. Annual data for Armed Forces are not usually released but may be estimated locally, as may student data. NRS releases data for prisoners in local areas, to local authorities on request. If these 'special populations' are not specified in a population projection, they are treated as part of the general population, and this is frequently the case.

Section 4.8: Review the contents of the input files.

Sections 4.9-4.11: Prepare, run and examine the results of a Training Projection, which examines past data to measure the demographic characteristics of each area.

Section 5: Develop the input files to include assumptions about the future, maintaining the same rates of change. NB. As mentioned, the Data Utility included an enhancement to initial in-migration suggested in Q&A 8, solution 2, p73 of the User Guide. At the end of Section 5.3, the file Mig_IN2 should be amended by deleting the tick on the All-Groups sheet in rows 7 and 8, as this option has been superseded by specific migration assumptions for each sub-Council area.

Section 6: Run a 'continuity projection' for your sub-Council areas.

Section 7: Develop household and other derived demographic projections, if you wish to.

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Appendix A   Source data and updates

The source data provided with the SCAP Data Utility consist of 6 files and a metadata file. The files should not be changed by the user:

`CONS_F.csv` and `CONS_M.csv`   Population by single years of age 0 to 89 and 90+, for each Datazone in Scotland from 2001 to the most recent year. Each file contains either Females or Males.

`FERT_F.csv and FERT_M.csv  Births`, for each Datazone in Scotland from 2001 to the most recent year. Each file contains either Females or Males.

`MORT_F.csv and MORT_M.csv  Deaths by age group` for each Datazone in Scotland from 2001 to the most recent year.

Each data file contains either Females or Males. Datazones are those defined using 2011 Census boundaries. For England, see Appendix C.

`Metadata.csv`   The metadata file records the years for which data can be found on each of the other files. It is supplied with the Data Utility but can also be created by the Utility.

Updating

When first released, the SCAP Data Utility contained the data up to the most recent mid-year estimate for Datazones, mid-2018. As further years' estimates are released, usually in the Autumn, the online version of the SCAP Data Utility will be updated with the latest year's population, births and deaths.

Appendix B   Excel Settings

When using any of the POPGROUP family of products, **macros must always be enabled**. Any security setting that disables macros completely will prevent the POPGROUP models from running correctly.

You may need to modify your Excel macro and security settings, which will differ depending on the version of Excel being used.

For users of Microsoft Excel 2003

To modify the security settings in Excel 2003:

1. Click on *Tools > Macros > Security*.

2. On the *'Security Level'* tab, set the macro security setting to 'Medium'.

3. On the *'Trusted Publishers'* tab, enable 'Trust access to Visual Basic Project'.

For users of Microsoft Excel 2007

In Excel 2007 the format of these controls is different. To modify the security settings in Excel 2007:

1. Click the round *'Office'* button in the top left hand corner of Excel.

2. Select *'Excel Options'* at the bottom of the drop-down menu.

3. Click on the *'Trust Center'* button on the left hand side of the dialog box and click *'Trust Center Settings'* on the right hand side.

4. Click on the *'Macro Settings'* button on the left hand side of the resulting dialog. Enable all macros and enable 'Trust access to the VBA project object model'. Although these are not the settings recommended by Excel, both these things must be enabled for POPGROUP to run successfully.

For users of Microsoft Excel 2010 and more recent

The format of the controls in Excel 2010, Excel 2013 and Excel 2016 is similar to in Excel 2007. To modify the security settings in Excel 2010, Excel 2013 and Excel 2016:

1. Select *File > Options*

2. Click on the *'Trust Center'* button on the left hand side of the dialog box and click *'Trust Center Settings'* on the right hand side.

3. Click on the *'ActiveX Settings'* button on the left hand side of the *'Trust Center Settings'* dialog. Previously the Active X Settings will have been set to 'Prompt me before enabling all controls with minimal restrictions', with safe mode also ticked. In order to enable Data Modules to work for Derived Forecasts, click on 'Enable all controls without restrictions and without prompting'.

Appendix C   Use in England and Wales

The SCAP Data Utility has been developed by NRS for use with Scotland Datazones. However, since data with the same detail are available from ONS for LSOAs in England and Wales, the Data Utility has been designed to also allow their use. It is hoped that those data will be packaged with a version of the Data Utility and that this user guide will apply equally to their use.